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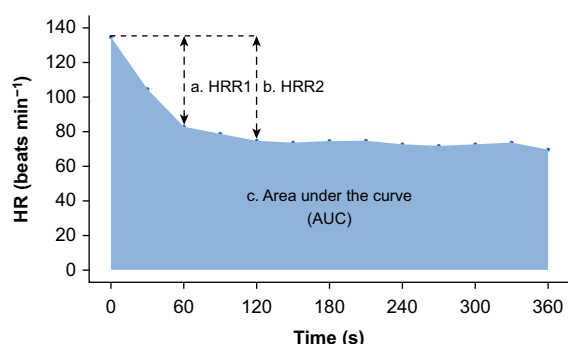


Fig 3. Methods for quantifying heart rate recovery (HRR). Example HRR vs time curve; time 0 reflects cessation of exercise. (a) HRR1—absolute difference between HR at exercise cessation and HR at 1 min of recovery. (b) HRR2—absolute difference between HR at exercise cessation and HR at 2 min of recovery. (c) Area under the curve—area under the HRR vs time curve (for 360 s of recovery) computed using trapezoid method. HRR, HR recovery.

comorbidities. Mean effort across all exercise tests was 63.8% (95% confidence interval: 62–65.7%) of age predicted maximal HR. HRR1 and HRR2 demonstrated poor reproducibility ($ICC \leq 0.45$ and $r \leq 0.53$ and $ICC \leq 0.29$ and $r \leq 0.47$, respectively) and AUC demonstrated moderate reproducibility ($ICC \geq 0.52$ and $r \geq 0.75$) across all comparisons.

HRR1/HRR2 demonstrated poor reproducibility and weak to moderate correlation across different modalities exercise testing suggesting they are influenced by the modality of exercise. The AUC method, however, demonstrates moderate reproducibility and strong positive correlation despite differing exercise modality, suggesting it may be a superior and more objective method for quantifying HRR after SET. For SETs to become standardised perioperative risk assessment tools, further work is required to assess the utility of the AUC method in perioperative risk prediction in patients undergoing thoracic surgery.

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Validation of days alive and out of hospital as a patient-centred outcome after lung resection surgery

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In the UK, lung cancer is the leading cause of death from malignancy with lung resection surgery offering the greatest chance of cure. Surgical management in this patient cohort is perceived as high risk; underlying comorbidity is common, hence surgical and perioperative complications are not

infrequent. Consequently, there has been a great deal of research focussing on minimising risk and improving outcome. Of crucial importance to this research is selection of an appropriate patient-centred measure.

Days alive and out of hospital at 30 days (DAOH₃₀) has potential as an upcoming patient-centred outcome in perioperative medicine, standardising interpretation of the surgical experience. DAOH has been validated in the perioperative setting but has not been studied specifically in the thoracic surgical population.¹ The aim of this study is to assess the construct validity of DAOH₃₀ as a patient-centred outcome after lung resection surgery.

Perioperative outcome data were collected from 92 patients enrolled within the bnP for pRediction of Outcome Following Lung rEsection Surgery (PROFILES) study. DAOH₃₀ was then calculated by interrogation of national information stores.

Construct validity was sought by assessing associations between DAOH₃₀ and pre-, intra- and postoperative predictors and indicators of perioperative experience. Defined constructs of interest were: preoperative—age, smoking status, alcohol consumption, preoperative malignancy, percentage predicted forced expiratory volume in 1 s, diffusing capacity of the lung for carbon monoxide (DLCO), and comorbidities including chronic obstructive pulmonary disease (COPD); intra-operative—duration of surgery/anaesthesia and procedure type; postoperative—complications, duration of high dependency unit/ hospital stay and subsequent re-admission. The t- or Mann–Whitney U-tests or Spearman's rank correlation coefficient were applied as appropriate.

The median (inter-quartile) DAOH₃₀ was 24 (22–26). DAOH₃₀ was less in patients with COPD, 23 (25.00–20.25), vs without COPD, 25 (27–23); $P=0.03$. Fewer DAOH₃₀ were observed in those with a preoperative diagnosis of malignancy, 24 (26–21), vs benign disease, 25 (27–23); $P=0.01$. There was no association between DAOH₃₀ and the remaining preoperative constructs ($P>0.33$ for all). The intraoperative constructs of type of procedure (minimally invasive surgery, 25 [27.00–22.75], vs open, 23 [24.25–20.00]; $P=0.01$), and duration of anaesthesia ($r=-0.26$, $P=0.02$) were significantly associated with DAOH₃₀. DAOH₃₀ was significantly associated with all postoperative constructs ($P<0.01$ for all).

DAOH₃₀ is being applied as an endpoint to studies enrolling patients undergoing both cardiac and noncardiac, non-thoracic surgeries. In our study DAOH₃₀ displays construct validity as a patient-centred outcome in the context of lung resection surgery, permitting consideration for use in thoracic surgery. DAOH₃₀ can be applied to both clinical trials and for quality improvement in healthcare delivery.

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Absent visitors: the wider implications of COVID-19 on cardiothoracic ICU staff: the VINCI Study

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Patients are not lone entities; they are part of larger social networks containing their family and others. Before the COVID-19 pandemic, visiting policies varied globally¹; many ICUs in the UK adopted a flexible approach to visiting. In March 2020 the rapidly progressing pandemic led the Scottish Government to stop non-essential visiting in hospitals. The impact of this policy on non-COVID-19 patients in cardiothoracic ICU, their relatives, and staff involved in their care is unknown. As one part of a mixed-method study, the experiences of staff caring for non-COVID-19 patients in a cardiothoracic ICU unit were explored.

Participants were recruited using purposive sampling. Data were collected using semi-structured interviews, transcribed, and analysed using grounded theory.

Twenty members of staff were recruited from a range of patient facing roles and experience. From initial coding a range of categories emerged. These were: isolation; delirium management; end-of-life issues; communication; and role and workload. Participants understood the necessity of the national visiting restrictions; however, they observed that the benefits came with notable negative effects on patients and their families.

A sense of increased workload emerged from the data, whether through spending longer with patients in order to reduce isolation or increased time speaking with families remotely. End-of-life care was particularly emotive: participants described experiences as 'barbaric' and speaking with families remotely as a 'professional low point'. This supports an emerging theory of an increased burden on staff (Fig. 4).

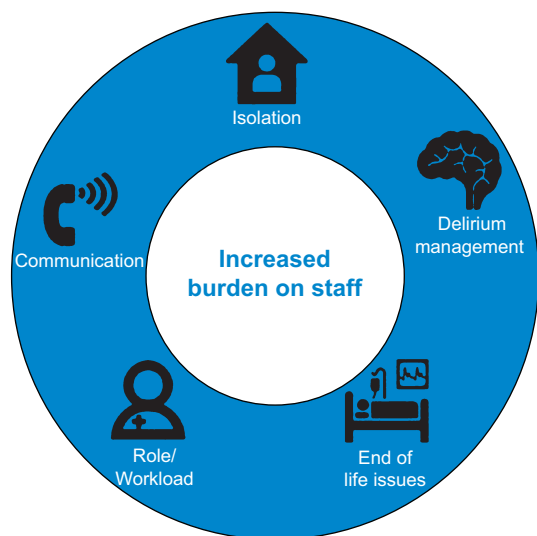


Fig 4 Workload and increased burden on staff.

This study shows an increased burden experienced by participants, not solely in the delivery of clinical care, highlighting the possible exposure of clinical staff not involved in COVID-19 care to potentially morally injurious events at this time. Moral injury is associated with events that lead to internal moral conflict and has potential to develop into other psychological issues.²

Further research is needed on identifying and supporting clinical staff with moral injury stemming from caring for ICU patients during COVID-19.

This study provides some insight into the experiences of clinical staff in the cardiothoracic ICU during the pandemic and should be considered alongside the experiences of patients and their families.

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Defining the drivers of decline in quality of life after lung cancer resection: a secondary analysis of the PROFILES database

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Lung cancer is the second most common cancer in the UK. Despite its curative potential, lung resection is associated with significant decline in quality of life (QoL) postoperatively. Currently the drivers of deterioration in QoL are poorly understood. It is imperative that we identify perioperative factors which are associated with a significant decline in post-operative QoL to allow testing of stratified interventions to ameliorate this decline.

This was a secondary analysis of the PROFILES study database, a prospective, observational cohort study recruiting patients presenting for lung cancer resection. This study analyses QoL data from 93 patients at the primary centre. The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ) C30 was administered at baseline, 3 months and 1 yr postoperatively. In line with the well-accepted minimal clinically important difference for EORTC QLQ-C30,¹ a significant decline in global QoL was defined as ≥ 10 point reduction in the summary score in this study. Multivariate logistic regression was performed based on this cut-off to explore the drivers of postoperative decline including comorbidities, lung function, cancer stage, and perioperative exposures.

A total of 75 patients were included in the final analysis at 3 months. The EORTC QLQ-C30 Summary Score trajectory over time can be seen in Figure 5. On multivariate analysis, receipt of volatile anaesthesia (vs TIVA) (odds ratio [OR]=2.93, confidence interval [CI]: 1.00–8.53) and cancer stage >1 (OR=2.40, CI: 1.12–5.17) were independently associated with a decline in global QoL at 3 months postoperatively, whereas better predicted postoperative lung function was protective (OR=1.04, CI: 1.01–1.08). The area under the receiver operating characteristic curve for this model is: 0.80 (CI: 0.70–0.90).

This study found that receiving volatile anaesthetic, having a cancer stage >1 , and poorer predicted postoperative lung function increased risk of a clinically significant decline in QoL at 3 months after lung cancer resection. The independent association between choice of anaesthetic technique and decline in QoL is an unexpected finding; if validated, it would be an